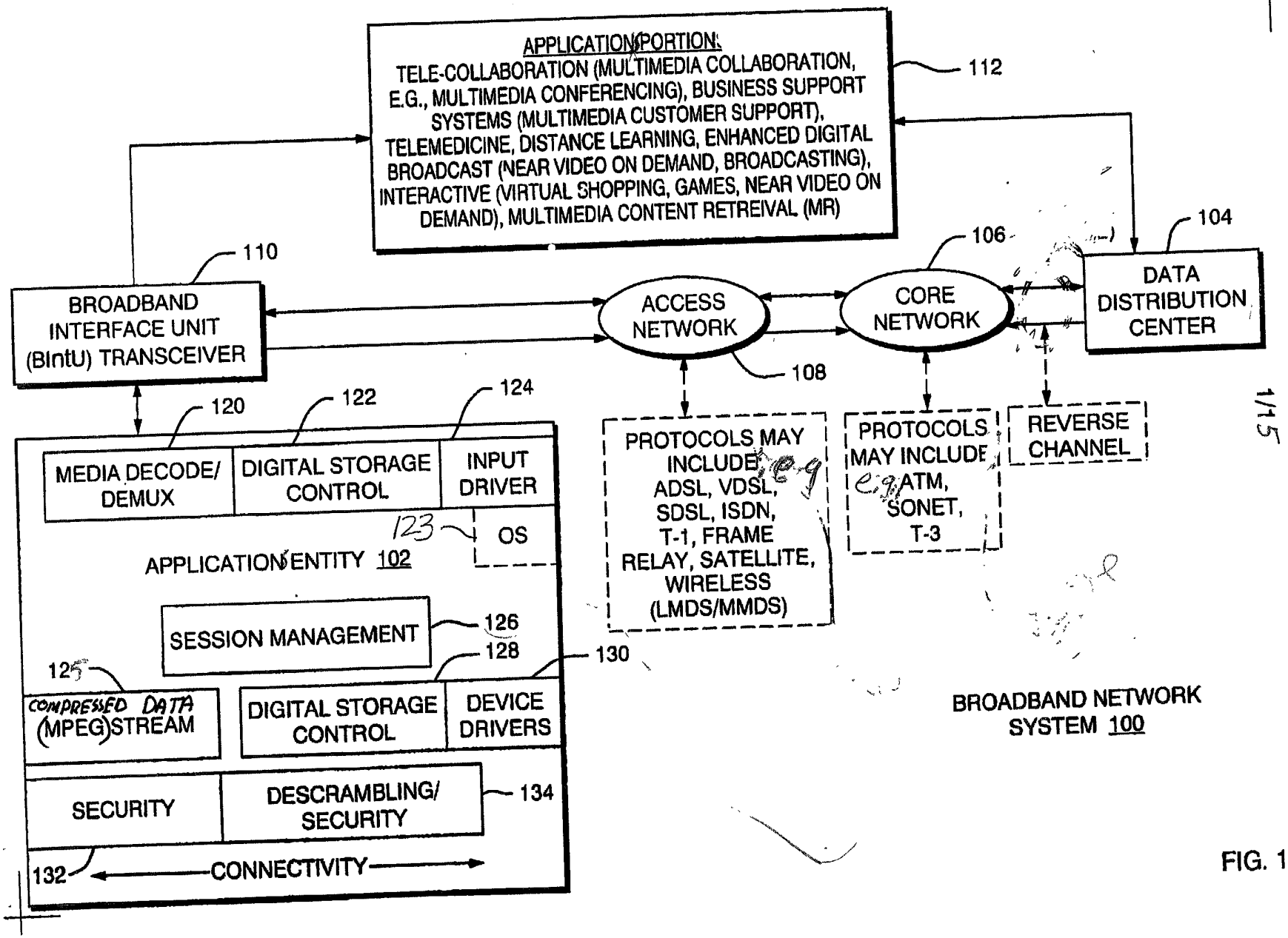
APPLICATION PORTION:
TELE-COLLABORATION (MULTIMEDIA COLLABORATION, E.G., MULTIMEDIA CONFERENCING), BUSINESS SUPPORT SYSTEMS (MULTIMEDIA CUSTOMER SUPPORT), TELEMEDICINE, DISTANCE LEARNING, ENHANCED DIGITAL BROADCAST (NEAR VIDEO ON DEMAND, BROADCASTING), INTERACTIVE (VIRTUAL SHOPPING, GAMES, NEAR VIDEO ON DEMAND), MULTIMEDIA CONTENT RETREIVAL (MR)
112
110
BROADBAND INTERFACE UNIT (BIntU) TRANSCEIVER
ACCESS NETWORK
108
106
CORE NETWORK
104
DATA DISTRIBUTION CENTER
120
122
124
MEDIA DECODE/ DEMUX
DIGITAL STORAGE CONTROL
INPUT DRIVER
123
OS
APPLICATION ENTITY 102
SESSION MANAGEMENT
126
125
128
130
COMPRESSED DATA (MPEG) STREAM
DIGITAL STORAGE CONTROL
DEVICE DRIVERS
SECURITY
DESCRAMBLING/ SECURITY
134
132
CONNECTIVITY
PROTOCOLS MAY INCLUDE, e.g. ADSL, VDSL, SDSL, ISDN, T-1, FRAME RELAY, SATELLITE, WIRELESS (LMDS/MMDS)
PROTOCOLS MAY INCLUDE e.g. ATM, SONET, T-3
REVERSE CHANNEL
BROADBAND NETWORK SYSTEM 100

FIG. 1

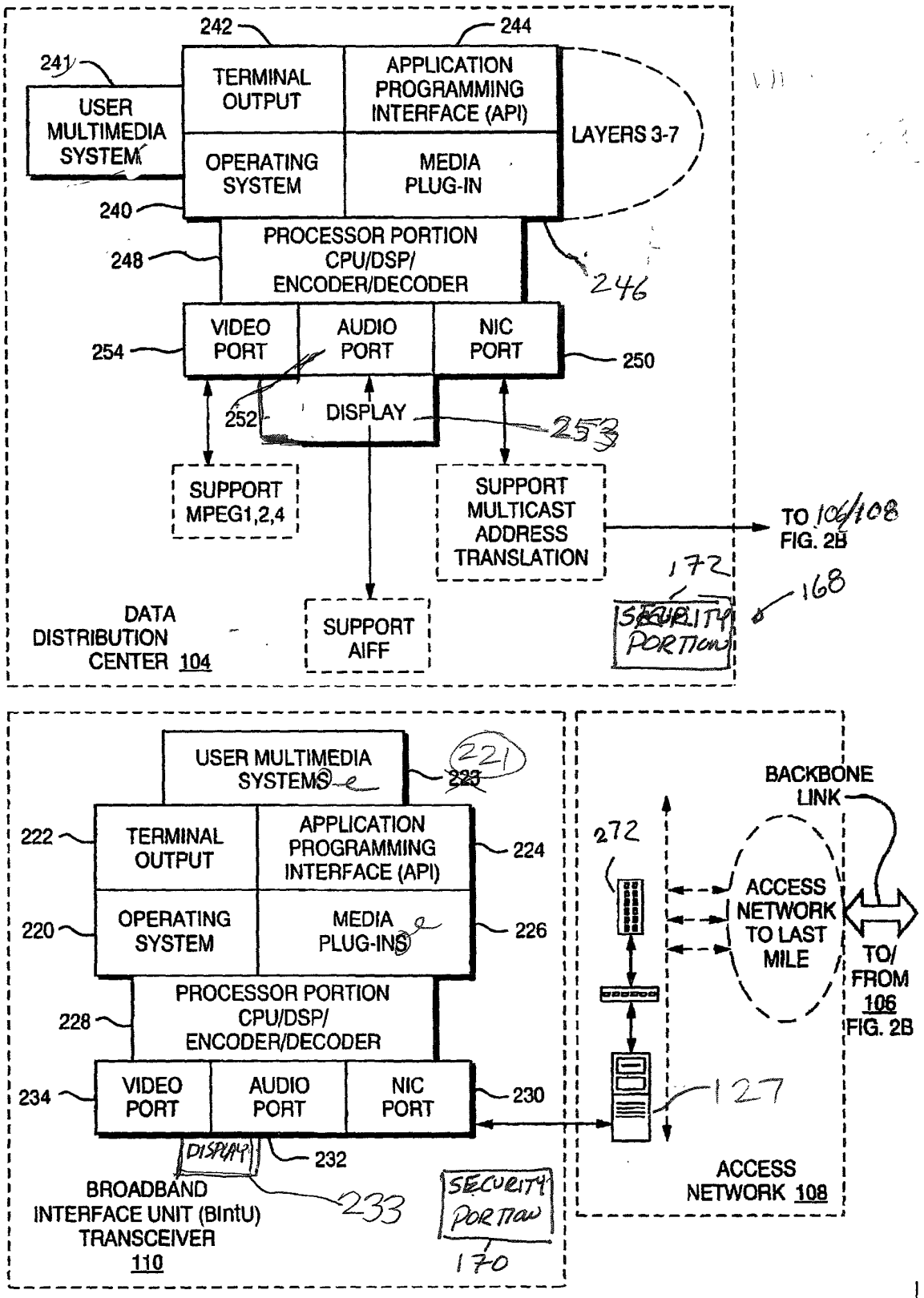
242
244
241
USER MULTIMEDIA SYSTEM
TERMINAL OUTPUT
APPLICATION PROGRAMMING INTERFACE (API)
OPERATING SYSTEM
MEDIA PLUG-IN
LAYERS 3-7
240
PROCESSOR PORTION CPU/DSP/ ENCODER/DECODER
248
246
VIDEO PORT
AUDIO PORT
NIC PORT
254
250
252
DISPLAY
253
SUPPORT MPEG1,2,4
SUPPORT MULTICAST ADDRESS TRANSLATION
TO 106/108 FIG. 2B
172
168
SECURITY PORTION
DATA DISTRIBUTION CENTER 104
SUPPORT AIFF
USER MULTIMEDIA SYSTEMS
221
223
222
TERMINAL OUTPUT
APPLICATION PROGRAMMING INTERFACE (API)
224
220
OPERATING SYSTEM
MEDIA PLUG-INS
226
PROCESSOR PORTION CPU/DSP/ ENCODER/DECODER
228
234
VIDEO PORT
AUDIO PORT
NIC PORT
230
DISPLAY
232
233
BROADBAND INTERFACE UNIT (BIntU) TRANSCEIVER 110
SECURITY PORTION
170
BACKBONE LINK
272
ACCESS NETWORK TO LAST MILE
TO/ FROM 106 FIG. 2B
127
ACCESS NETWORK 108

FIG. 2A

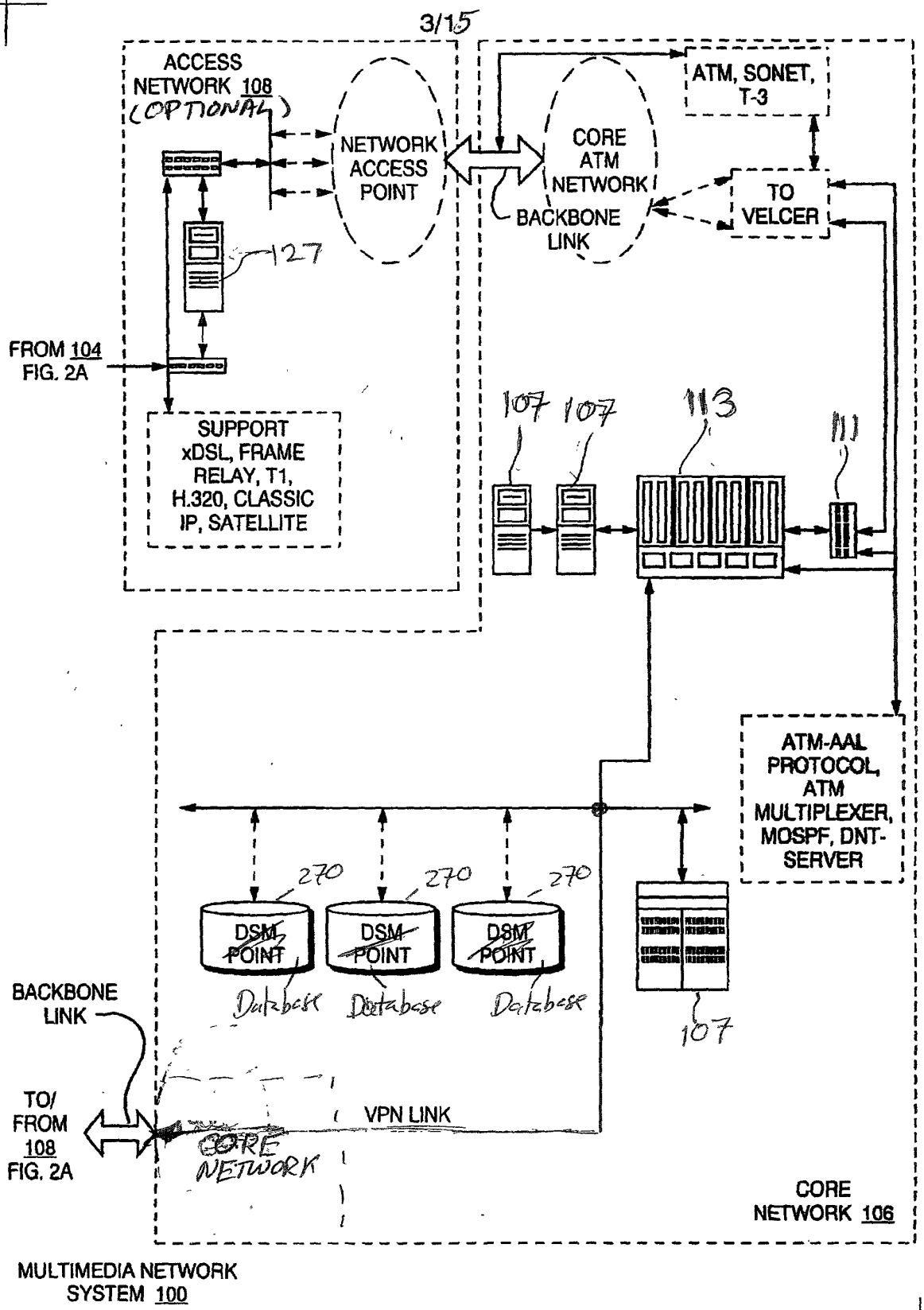
ACCESS NETWORK 108 (OPTIONAL)
NETWORK ACCESS POINT
CORE ATM NETWORK
BACKBONE LINK
ATM, SONET, T-3
TO VELCER
127
FROM 104 FIG. 2A
SUPPORT xDSL, FRAME RELAY, T1, H.320, CLASSIC IP, SATELLITE
107
107
113
111
ATM-AAL PROTOCOL, ATM MULTIPLEXER, MOSPF, DNT-SERVER
270
270
270
DSM POINT
DSM POINT
DSM POINT
Database
Database
Database
107
BACKBONE LINK
TO/ FROM 108 FIG. 2A
VPN LINK
CORE NETWORK
CORE NETWORK 106
MULTIMEDIA NETWORK SYSTEM 100

FIG. 2B

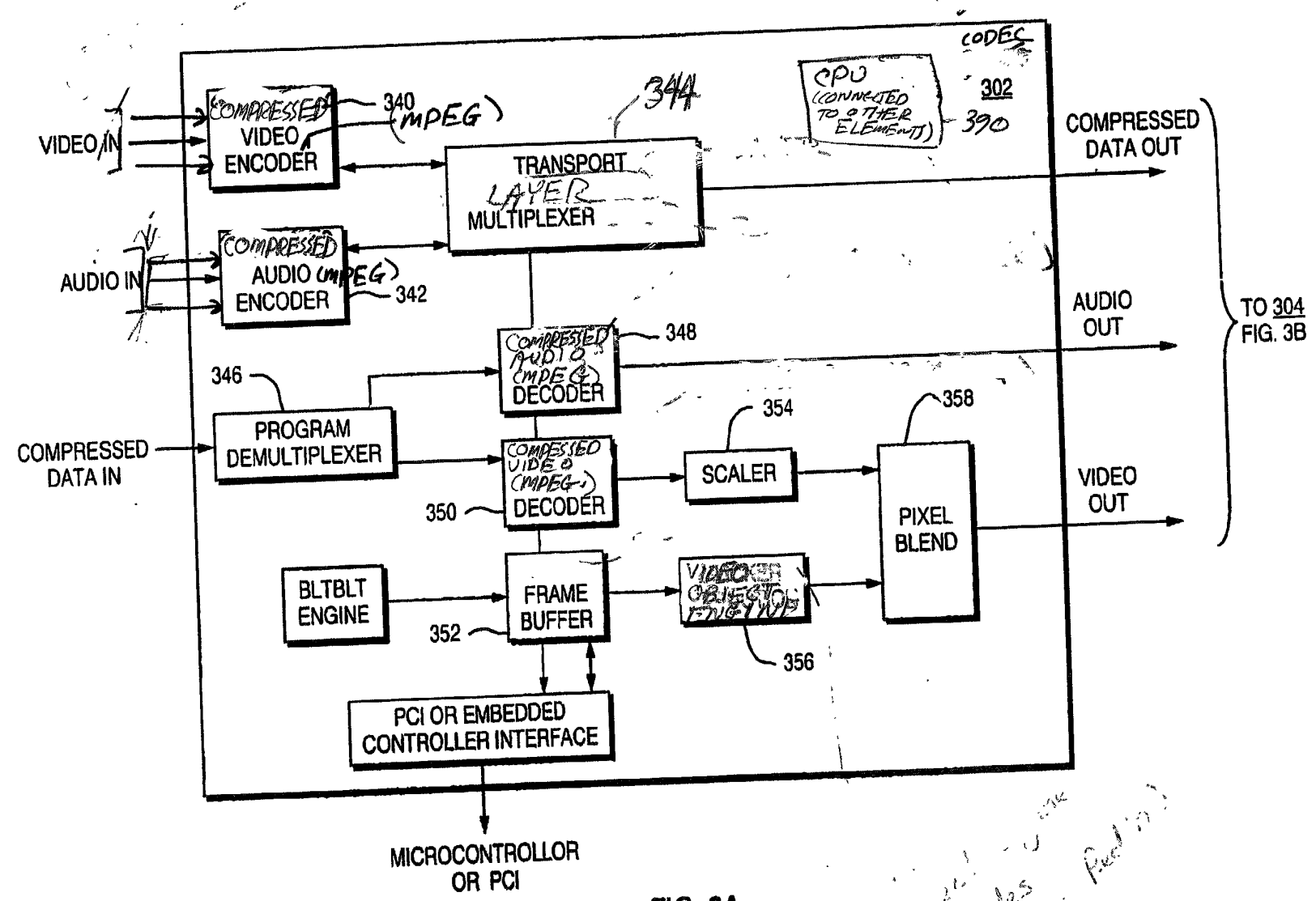
CODEC
CPU (CONNECTED TO OTHER ELEMENT)
302
390
344
VIDEO IN
COMPRESSED VIDEO ENCODER
340
(MPEG)
TRANSPORT LAYER MULTIPLEXER
COMPRESSED DATA OUT
AUDIO IN
COMPRESSED AUDIO (MPEG) ENCODER
342
AUDIO OUT
TO 304 FIG. 3B
348
COMPRESSED AUDIO (MPEG) DECODER
346
PROGRAM DEMULTIPLEXER
354
358
COMPRESSED DATA IN
COMPRESSED VIDEO (MPEG) DECODER
SCALER
PIXEL BLEND
VIDEO OUT
350
BLTBLT ENGINE
FRAME BUFFER
VIDEO OBJECT PLANE
352
356
PCI OR EMBEDDED CONTROLLER INTERFACE
MICROCONTROLLOR OR PCI

FIG. 3A

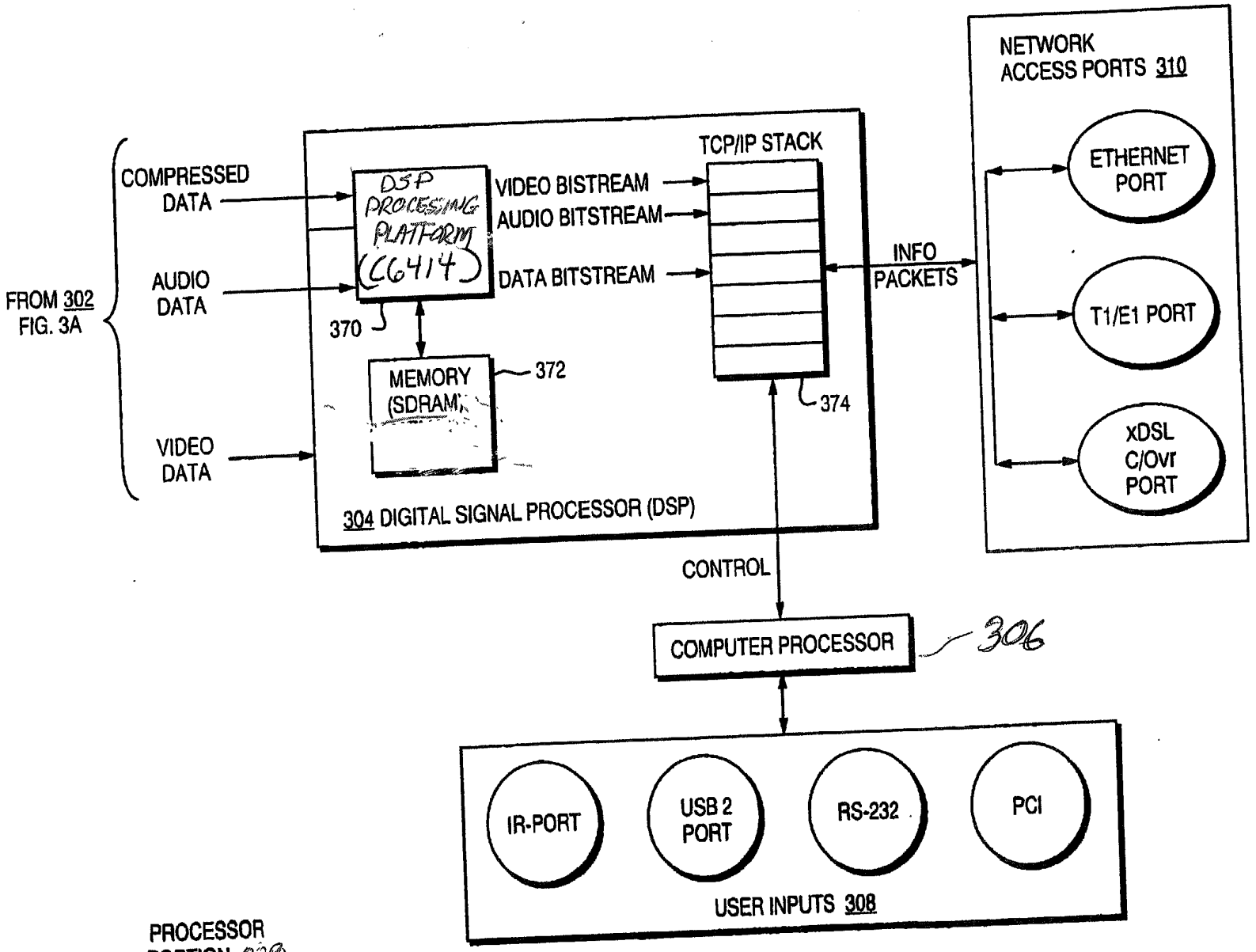
NETWORK ACCESS PORTS 310
ETHERNET PORT
T1/E1 PORT
xDSL C/Ovr PORT
TCP/IP STACK
INFO PACKETS
FROM 302 FIG. 3A
COMPRESSED DATA
AUDIO DATA
VIDEO DATA
DSP PROCESSING PLATFORM (C6414)
370
MEMORY (SDRAM)
372
VIDEO BISTREAM
AUDIO BITSTREAM
DATA BITSTREAM
374
304 DIGITAL SIGNAL PROCESSOR (DSP)
CONTROL
COMPUTER PROCESSOR
306
IR-PORT
USB 2 PORT
RS-232
PCI
USER INPUTS 308
PROCESSOR PORTION 228

FIG. 3B

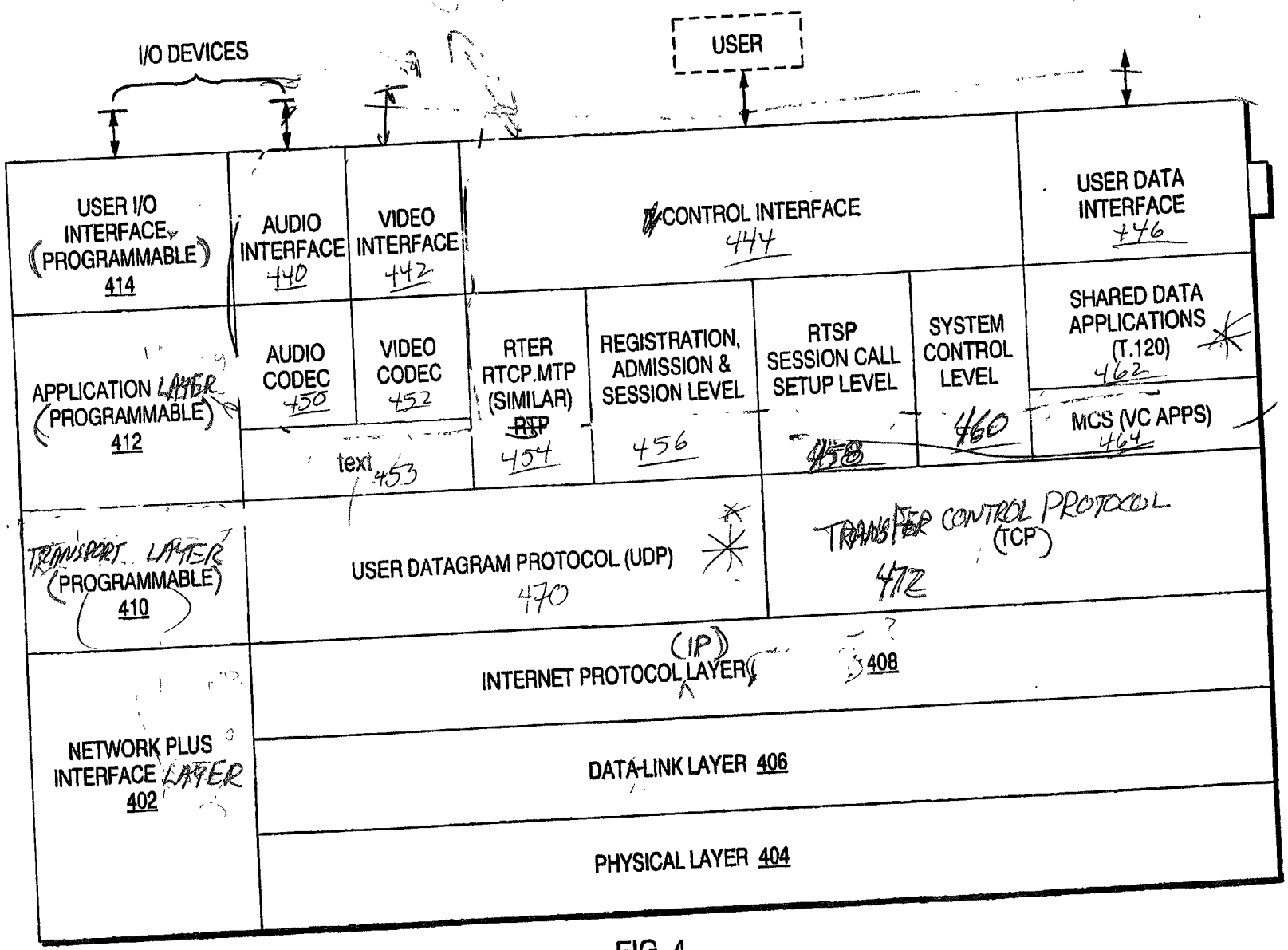
I/O DEVICES
USER
USER I/O INTERFACE (PROGRAMMABLE) 414
AUDIO INTERFACE 440
VIDEO INTERFACE 442
CONTROL INTERFACE 444
USER DATA INTERFACE 446
APPLICATION LAYER (PROGRAMMABLE) 412
AUDIO CODEC 450
VIDEO CODEC 452
RTER RTCP.MTP (SIMILAR) RTP 454
REGISTRATION, ADMISSION & SESSION LEVEL 456
RTSP SESSION CALL SETUP LEVEL 458
SYSTEM CONTROL LEVEL 460
SHARED DATA APPLICATIONS (T.120) 462
MCS (VC APPS) 464
text 453
TRANSPORT LAYER (PROGRAMMABLE) 410
USER DATAGRAM PROTOCOL (UDP) 470
TRANSFER CONTROL PROTOCOL (TCP) 472
INTERNET PROTOCOL LAYER (IP) 408
NETWORK PLUS INTERFACE LAYER 402
DATA-LINK LAYER 406
PHYSICAL LAYER 404

FIG. 4

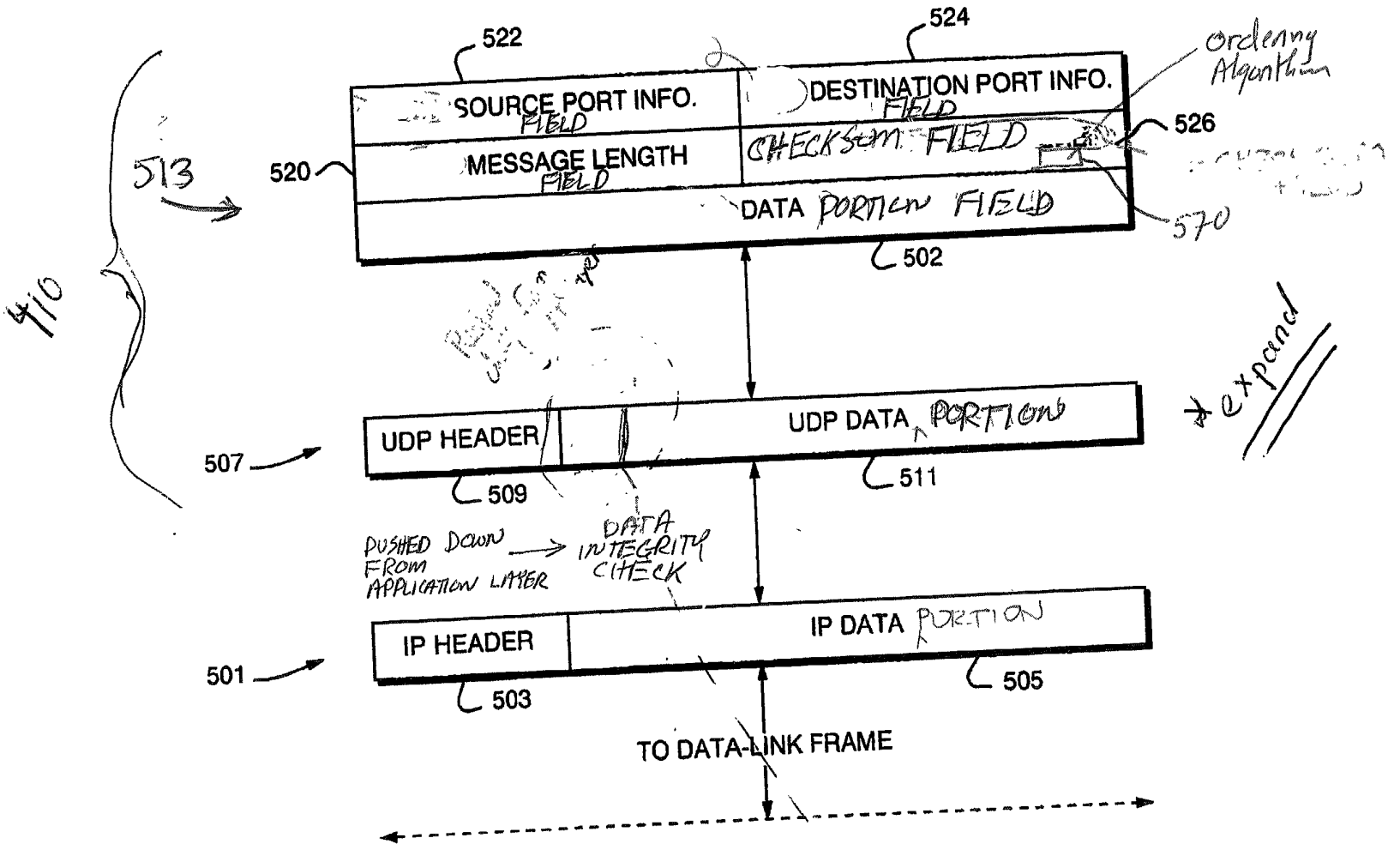
522
524
SOURCE PORT INFO. FIELD
DESTINATION PORT INFO. FIELD
MESSAGE LENGTH FIELD
CHECKSUM FIELD
DATA PORTION FIELD
520
526
570
502
513
510
UDP HEADER
UDP DATA PORTION
507
509
511
PUSHED DOWN FROM APPLICATION LAYER
DATA INTEGRITY CHECK
IP HEADER
IP DATA PORTION
501
503
505
TO DATA-LINK FRAME

FIG. 5

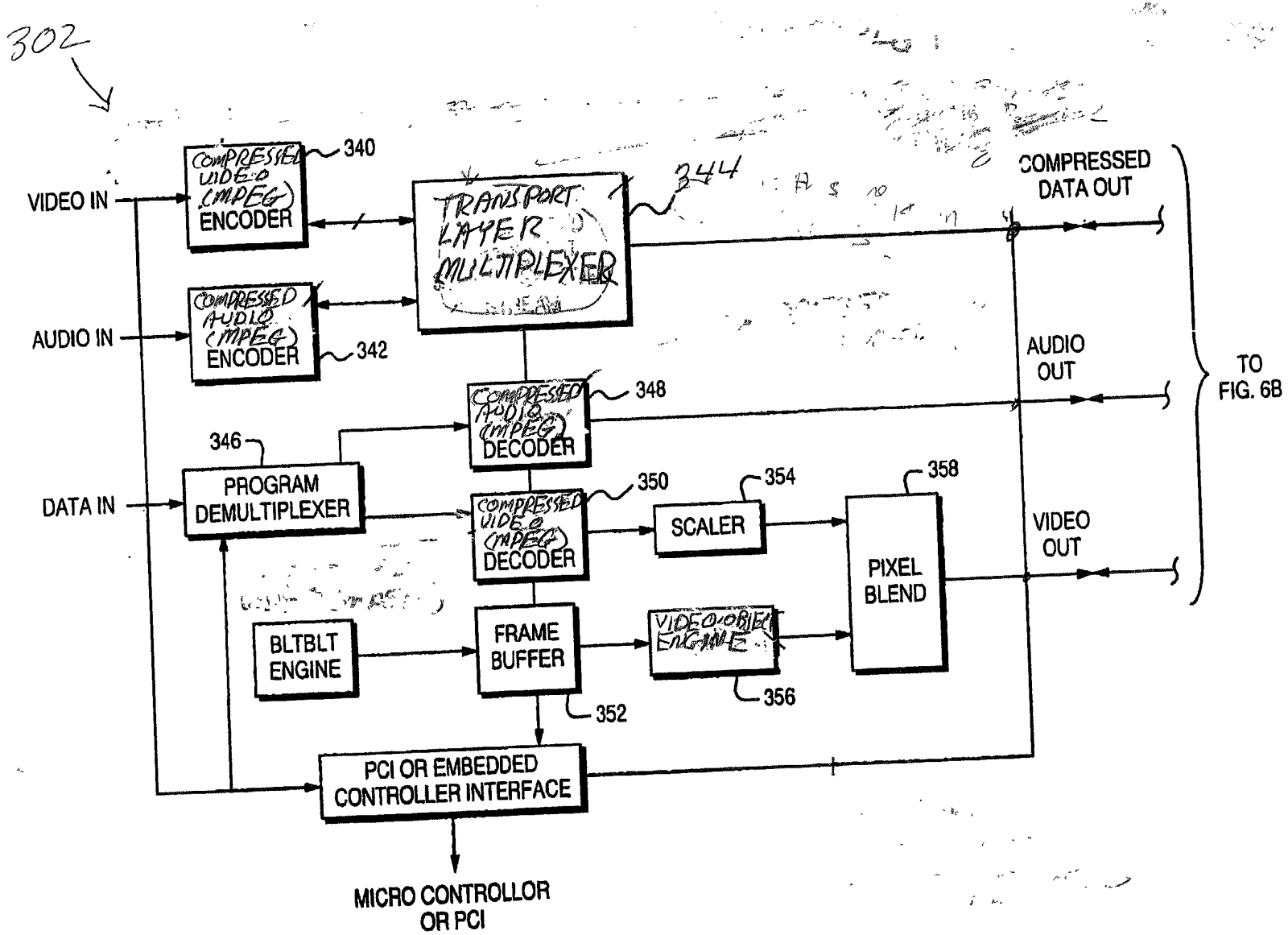
302
VIDEO IN
AUDIO IN
DATA IN
COMPRESSED VIDEO (MPEG) ENCODER
340
COMPRESSED AUDIO (MPEG) ENCODER
342
PROGRAM DEMULTIPLEXER
346
TRANSPORT LAYER MULTIPLEXER
344
COMPRESSED AUDIO (MPEG) DECODER
348
COMPRESSED VIDEO (MPEG) DECODER
350
SCALER
354
PIXEL BLEND
358
BLTBLT ENGINE
FRAME BUFFER
352
VIDEO OBJECT ENGINE
356
PCI OR EMBEDDED CONTROLLER INTERFACE
MICRO CONTROLLOR OR PCI
COMPRESSED DATA OUT
AUDIO OUT
VIDEO OUT
TO FIG. 6B

FIG. 6A

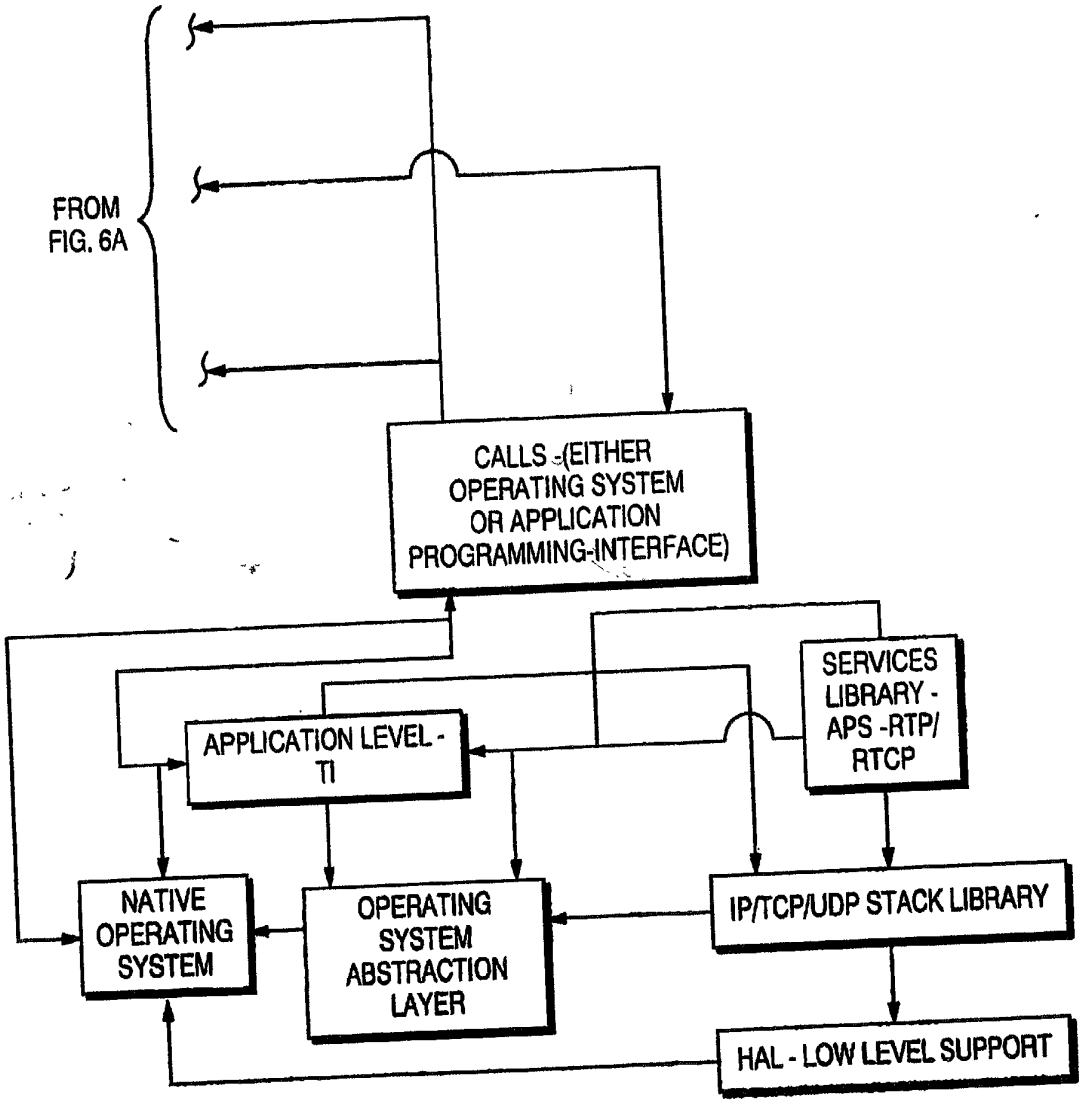
FROM FIG. 6A
CALLS - (EITHER OPERATING SYSTEM OR APPLICATION PROGRAMMING-INTERFACE)
APPLICATION LEVEL - TI
SERVICES LIBRARY - APS -RTP/ RTCP
NATIVE OPERATING SYSTEM
OPERATING SYSTEM ABSTRACTION LAYER
IP/TCP/UDP STACK LIBRARY
HAL - LOW LEVEL SUPPORT

FIG. 6B

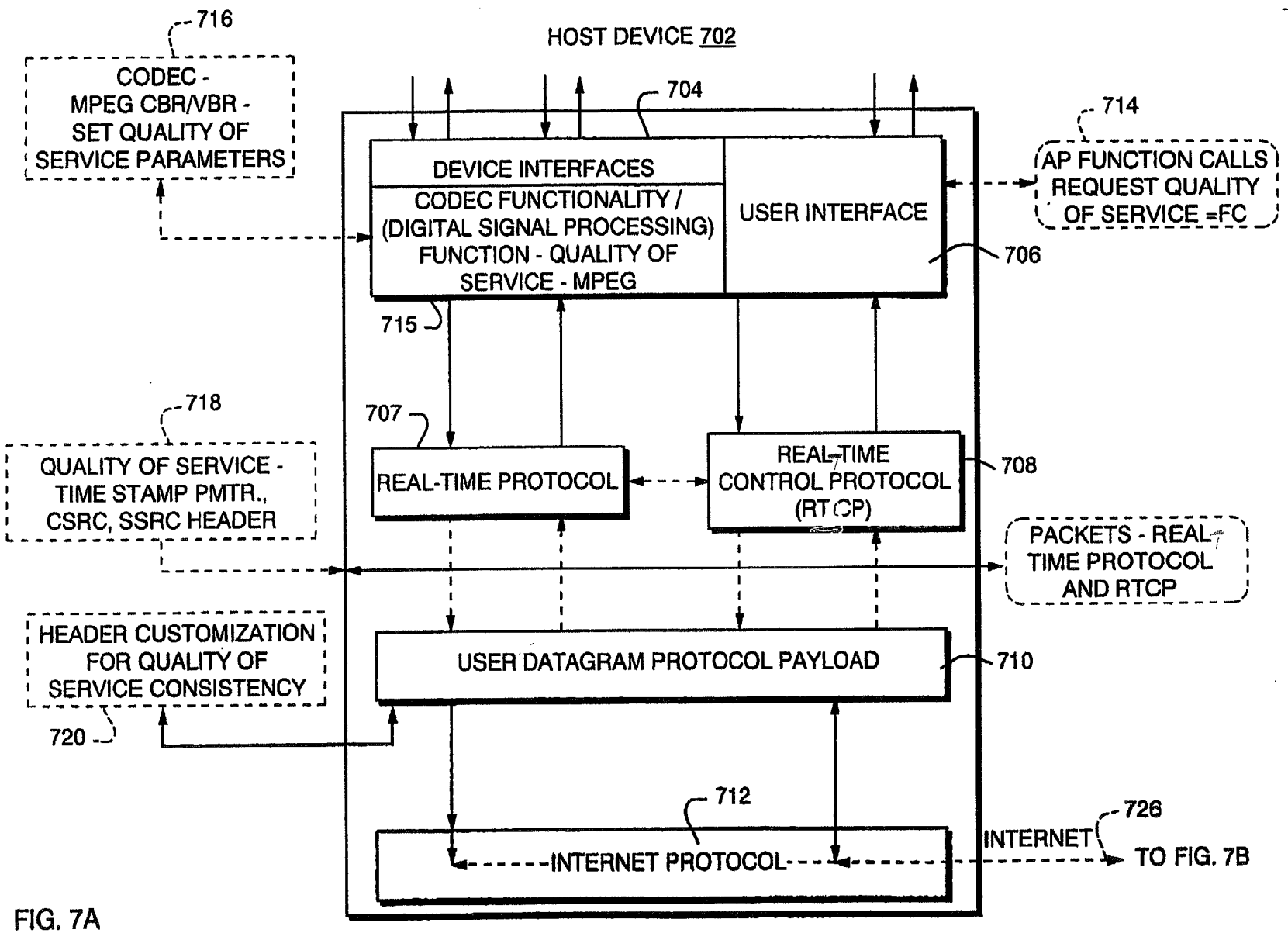
716
CODEC - MPEG CBR/VBR - SET QUALITY OF SERVICE PARAMETERS
HOST DEVICE 702
704
DEVICE INTERFACES
CODEC FUNCTIONALITY / (DIGITAL SIGNAL PROCESSING) FUNCTION - QUALITY OF SERVICE - MPEG
USER INTERFACE
714
AP FUNCTION CALLS REQUEST QUALITY OF SERVICE =FC
706
715
718
QUALITY OF SERVICE - TIME STAMP PMTR., CSRC, SSRC HEADER
707
REAL-TIME PROTOCOL
REAL-TIME CONTROL PROTOCOL (RTCP)
708
PACKETS - REAL-TIME PROTOCOL AND RTCP
HEADER CUSTOMIZATION FOR QUALITY OF SERVICE CONSISTENCY
USER DATAGRAM PROTOCOL PAYLOAD
710
720
712
INTERNET PROTOCOL
726
INTERNET
TO FIG. 7B

FIG. 7A

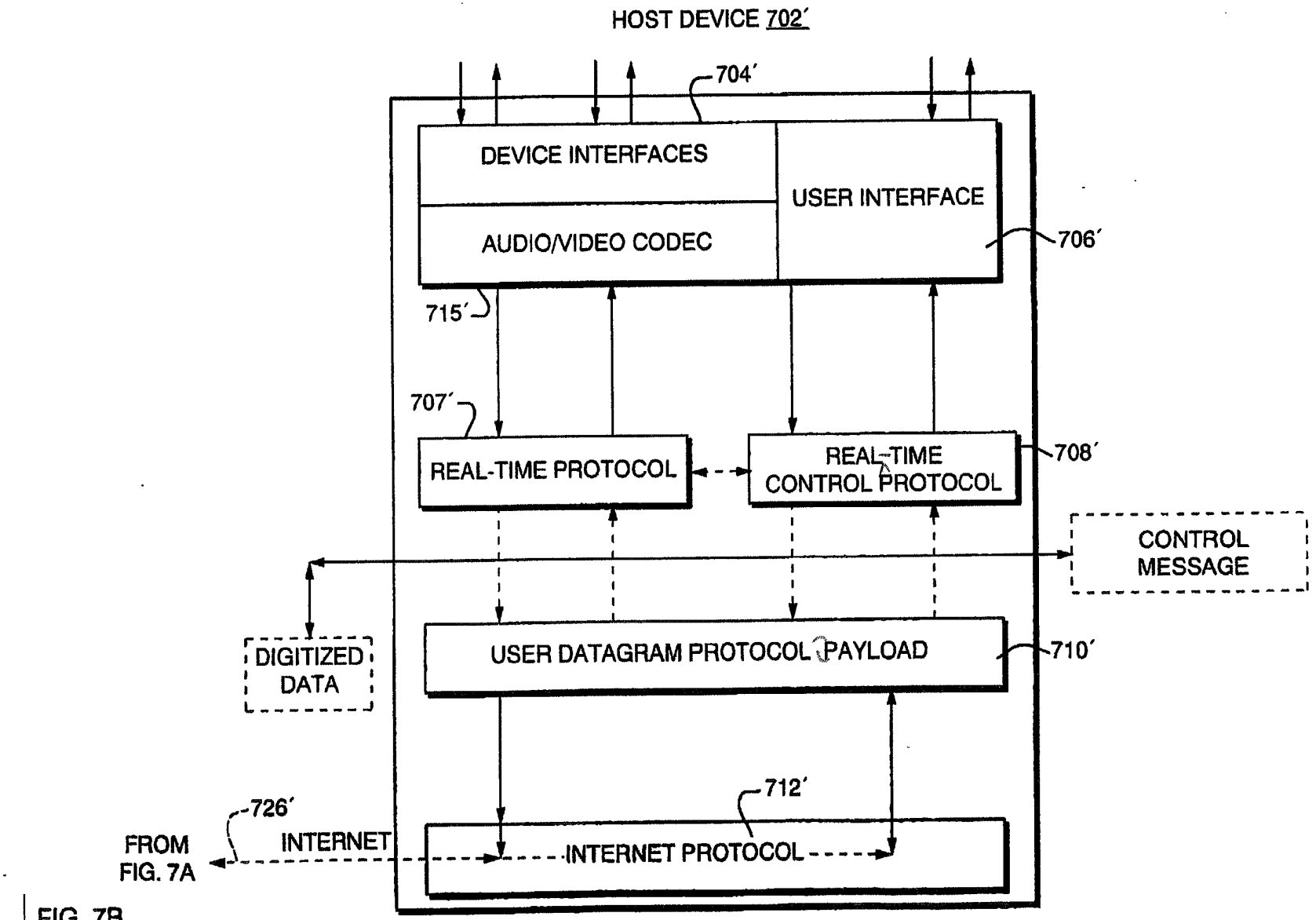
HOST DEVICE 702'
704'
DEVICE INTERFACES
AUDIO/VIDEO CODEC
USER INTERFACE
706'
715'
707'
REAL-TIME PROTOCOL
REAL-TIME CONTROL PROTOCOL
708'
CONTROL MESSAGE
DIGITIZED DATA
USER DATAGRAM PROTOCOL PAYLOAD
710'
712'
726'
FROM FIG. 7A
INTERNET
INTERNET PROTOCOL

FIG. 7B

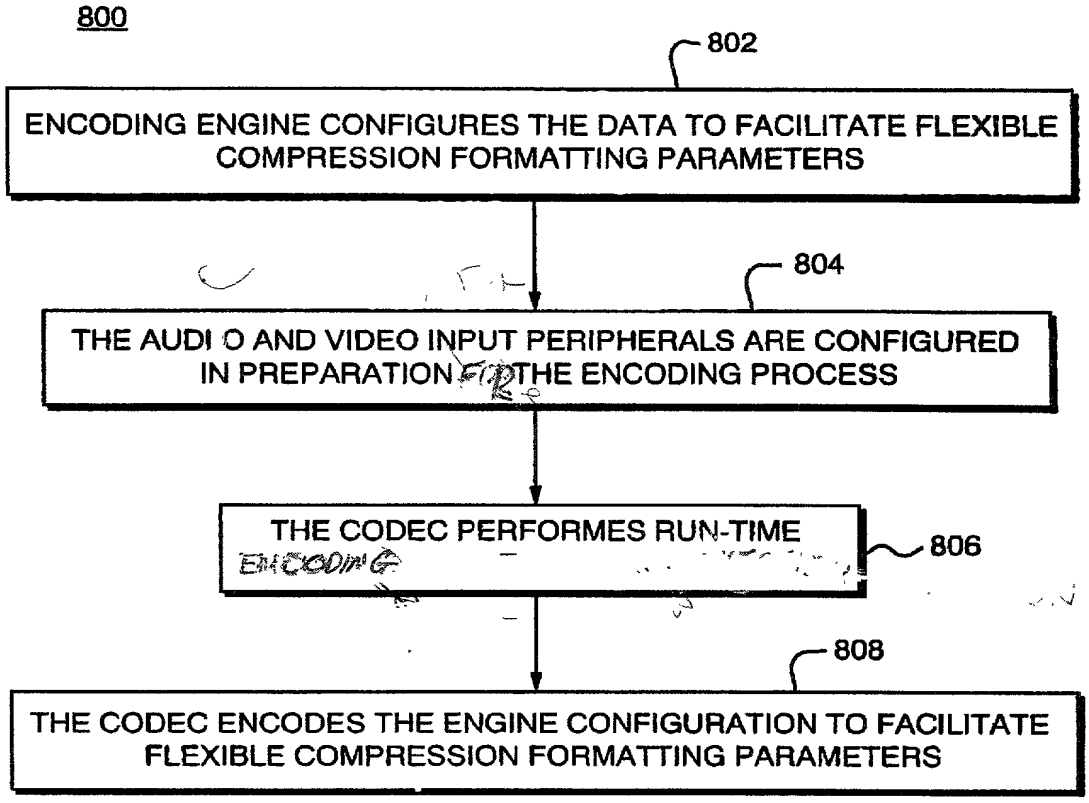
800
802
ENCODING ENGINE CONFIGURES THE DATA TO FACILITATE FLEXIBLE COMPRESSION FORMATTING PARAMETERS
804
THE AUDIO AND VIDEO INPUT PERIPHERALS ARE CONFIGURED IN PREPARATION FOR THE ENCODING PROCESS
THE CODEC PERFORMES RUN-TIME ENCODING
806
808
THE CODEC ENCODES THE ENGINE CONFIGURATION TO FACILITATE FLEXIBLE COMPRESSION FORMATTING PARAMETERS

FIG. 8

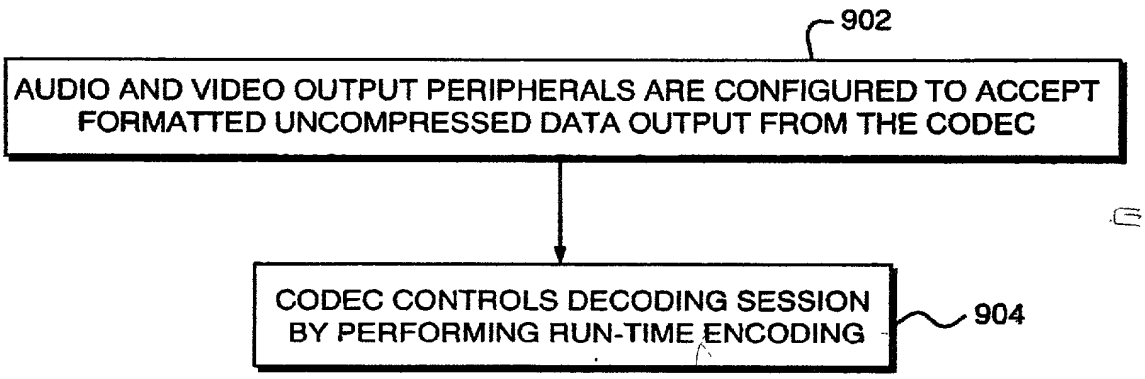
900
902
AUDIO AND VIDEO OUTPUT PERIPHERALS ARE CONFIGURED TO ACCEPT FORMATTED UNCOMPRESSED DATA OUTPUT FROM THE CODEC
CODEC CONTROLS DECODING SESSION BY PERFORMING RUN-TIME ENCODING
904

FIG. 9

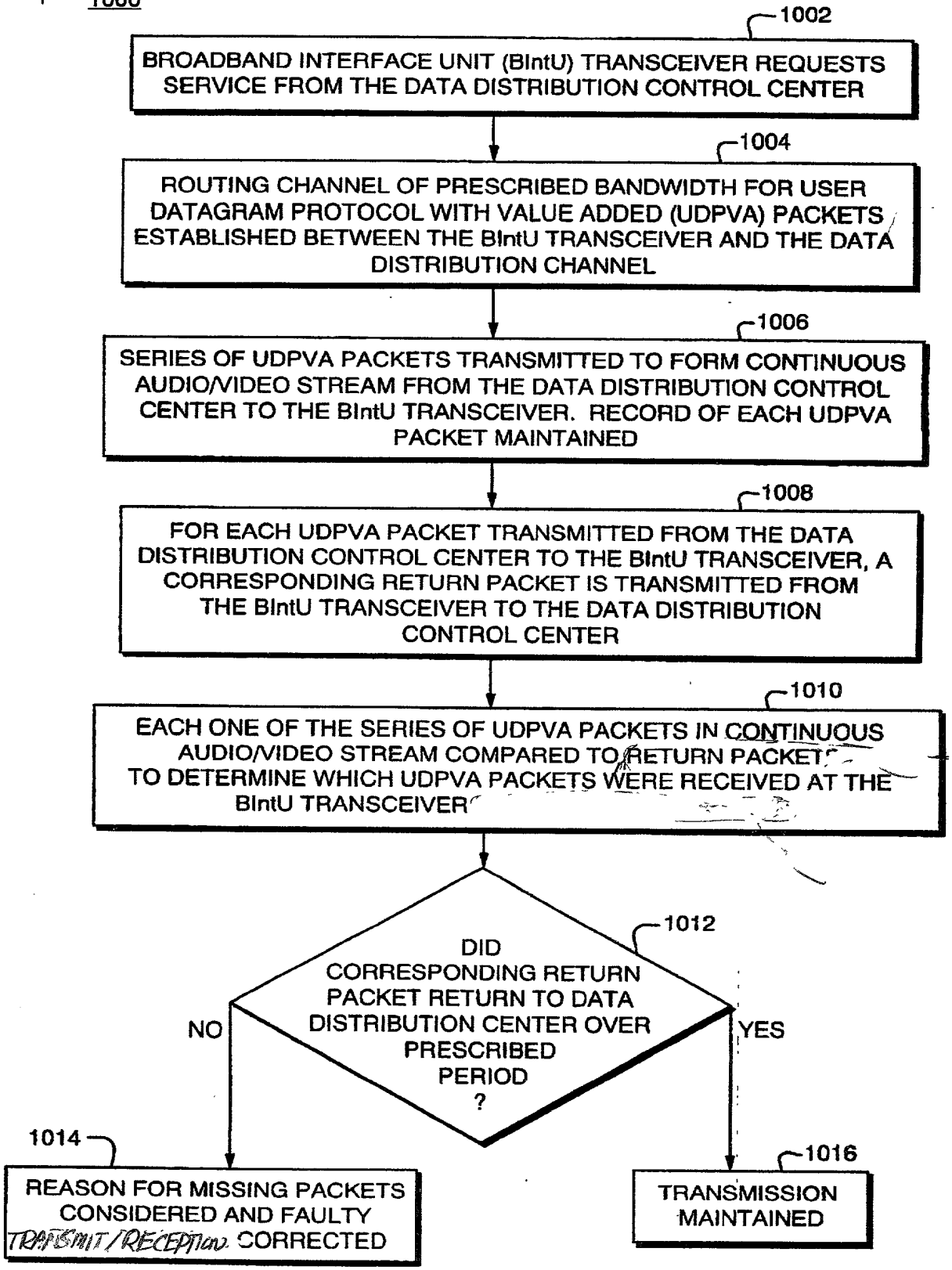
1000
1002
BROADBAND INTERFACE UNIT (BIntU) TRANSCEIVER REQUESTS SERVICE FROM THE DATA DISTRIBUTION CONTROL CENTER
1004
ROUTING CHANNEL OF PRESCRIBED BANDWIDTH FOR USER DATAGRAM PROTOCOL WITH VALUE ADDED (UDPVA) PACKETS ESTABLISHED BETWEEN THE BIntU TRANSCEIVER AND THE DATA DISTRIBUTION CHANNEL
1006
SERIES OF UDPVA PACKETS TRANSMITTED TO FORM CONTINUOUS AUDIO/VIDEO STREAM FROM THE DATA DISTRIBUTION CONTROL CENTER TO THE BIntU TRANSCEIVER. RECORD OF EACH UDPVA PACKET MAINTAINED
1008
FOR EACH UDPVA PACKET TRANSMITTED FROM THE DATA DISTRIBUTION CONTROL CENTER TO THE BIntU TRANSCEIVER, A CORRESPONDING RETURN PACKET IS TRANSMITTED FROM THE BIntU TRANSCEIVER TO THE DATA DISTRIBUTION CONTROL CENTER
1010
EACH ONE OF THE SERIES OF UDPVA PACKETS IN CONTINUOUS AUDIO/VIDEO STREAM COMPARED TO RETURN PACKETS TO DETERMINE WHICH UDPVA PACKETS WERE RECEIVED AT THE BIntU TRANSCEIVER
1012
DID CORRESPONDING RETURN PACKET RETURN TO DATA DISTRIBUTION CENTER OVER PRESCRIBED PERIOD ?
NO
YES
1014
REASON FOR MISSING PACKETS CONSIDERED AND FAULTY TRANSMIT/RECEPTION CORRECTED
1016
TRANSMISSION MAINTAINED

FIG. 10

T02T0T' E92T8660

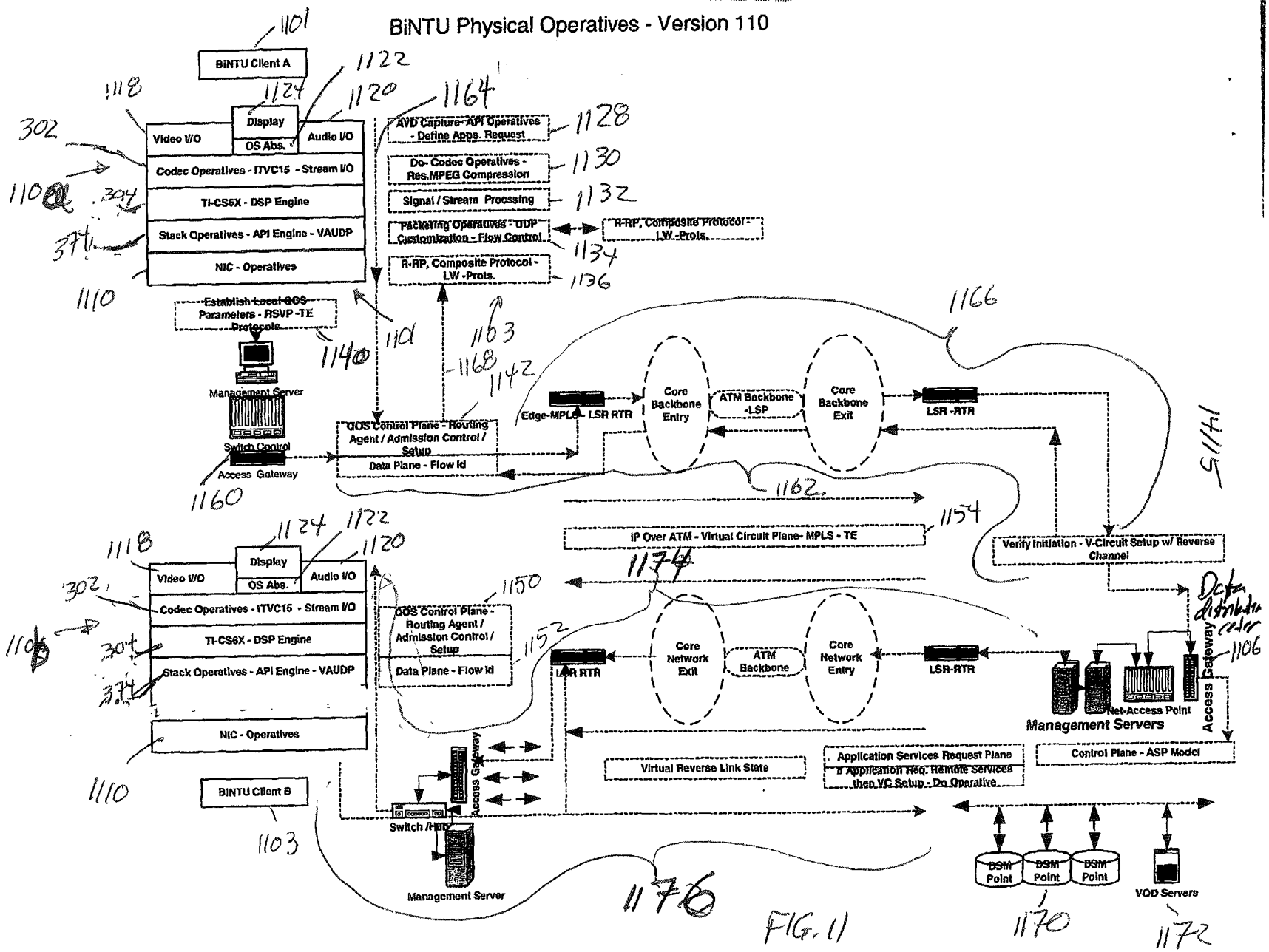

FIG. 1

BIntU - Data Flow - QOS

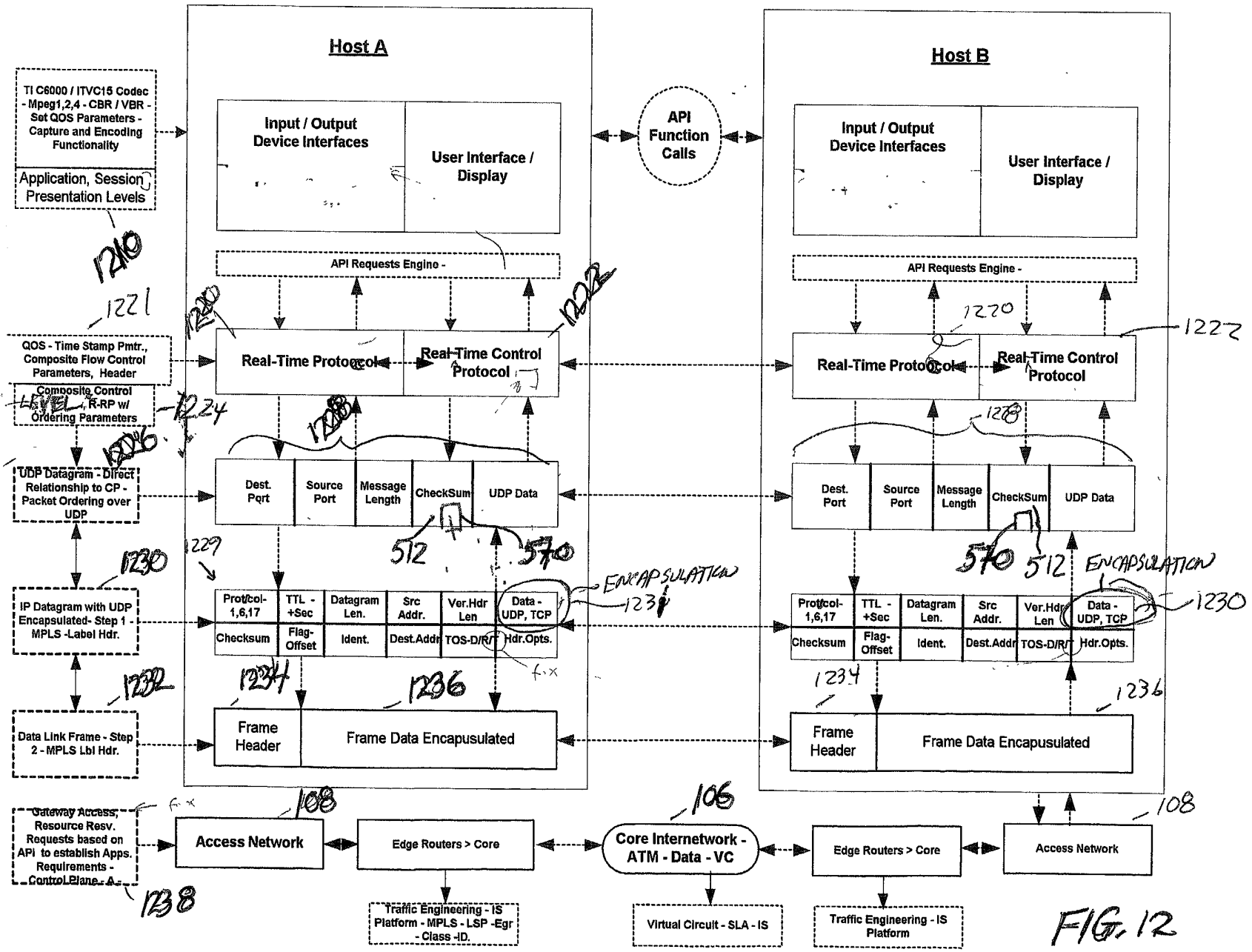

FIG. 12